

Remarks

I. Status of claims

Claims 1-26 were pending.

Claim 27 has been added. Claim 27 recites elements that essentially track the elements of independent claim 1.

The Examiner has indicated that claim 17 would be allowable if rewritten in independent form.

II. Claim rejections under 35 U.S.C. § 103

A. Claim rejections over Dolan

1. Introduction

The Examiner has rejected claims 1-8, 10, 14-16, and 18-26 under 35 U.S.C. § 103(a) over Dolan (US 7,043,080).

Under 35 U.S.C. § 103(a), "A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

In order to sustain a rejection under 35 U.S.C. § 103, an examiner bears the initial burden of establishing *prima facie* obviousness. See *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). To support a *prima facie* conclusion of obviousness, the prior art must disclose or suggest all the limitations of the claimed invention.¹ See *In re Lowry*, 32 F.3d 1579, 1582, 32 USPQ2d 1 031, 1034 (Fed. Cir. 1994). If the examiner has established a *prima*

¹ The U.S. Patent and Trademark Office has set forth the following definition of the requirements for establishing a *prima facie* case of unpatentability (37 CFR § 1.56(b)(ii)):

A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

facie case of obviousness, the burden of going forward then shifts to the applicant to overcome the *prima facie* case with argument and/or evidence. Obviousness, is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. This inquiry requires (a) determining the scope and contents of the prior art; (b) ascertaining the differences between the prior art and the claims in issue; (c) resolving the level of ordinary skill in the pertinent art; and (d) evaluating evidence of secondary consideration. See KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 2 (U.S. Apr. 30, 2007) (citing Graham v. John Deere, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966)). If all claim limitations are found in a number of prior art references, the fact finder must determine whether there was an apparent reason to combine the known elements in the fashion claimed. See KSR, slip op. at 14. This analysis should be made explicit. KSR, slip op at 14 (citing In re Kahn, 441 F. 3d 977, 988 (CA Fed. 2006): “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

2. Independent claim 1

Independent claim 1 recites:

Claim 1 (original): A method of enhancing text-like edges in an image of pixels, comprising the steps of:

segmenting pixels in a block of image pixels into first and second pixel classes; and

edge enhancing the pixel block in response to a determination that the pixel block likely contains at least one text-like edge based on a measure of distance separating intensity values respectively representing intensity distributions of the first and second classes and based on measures of peakedness of intensity histograms computed for both the first and second pixel classes.

As explained in detail below, the rejection of independent claim 1 under 35 U.S.C. § 103(a) over Dolan should be withdrawn because the Examiner has not shown that the cited references disclose each and every element of the claim.

The Examiner has given the following rationale in support of the rejection of independent claim 1 (emphasis added):

With regard to claim 1, Dolan discloses segmenting pixels in a block of image pixels into first and second pixel classes (please refer to col. 3, lines 1-6); and

edge enhancing the pixel block in response to a determination that the pixel block likely contains at least one text-like edge based (refer to Fig. 3, shows that the edge of text image is processed) on a measure of distance separating intensity values respectively representing intensity distributions of the first and second classes (refer to col. 4, lines 1-14, that is, edge and valley reads on first and second classes) and based on measures of peakedness of intensity histograms computed for both the first and second pixel classes (refer to col. 3, lines 36-45, reads on measuring the distance between edge and an adjacent valley). Although, Dolan reference does not expressly call for measure of distance separating intensity values respectively representing intensity distributions of the first and second classes and based on measuring peakedness of intensity histograms computed for both the first and second pixel classes, it would have been obvious to a person of an ordinary skill in the art that Dolan does in fact shows "measuring in the direction of the intensity gradient when measuring to a ridge and direction opposite to the intensity gradient when measuring to a valley". Thus, an ordinary artisan would have recognized the term "measuring in the direction of the intensity gradient of an edge and an adjacent valley" as similar limitation as claim 1.

Thus, the Examiner's rejection of independent claim 1 relies on the following premises:

(a) the identified edge pixels constitute the first class and the identified valley pixels constitute the second class; (b) the geometric distance between an edge pixel and a valley (as described in col. 4, lines 1-14) constitutes a measure of distance separating intensity values respectively representing intensity distributions of the first and second classes; and (c) the intensity differential of adjacent pixels based process of detecting ridges and valleys (as described in col. 3, lines 36-45) constitutes measuring peakedness of intensity histograms computed for both the first and second pixel classes.

The disclosure (i.e., col. 3, lines 1-6) cited by the Examiner in support of the assertion that Dolan discloses the "segmenting" element of claim 1 does not, in fact, disclose anything

whatsoever about segmenting pixels in a block of image pixels into first and second pixels classes. Instead, this cited disclosure merely states that each character segment may be referred to as a "stroke" and that text may be detected by the presence of strokes. Moreover, even assuming for the purpose of argument only that the Examiner's first premise is true (i.e., "edge and valley reads on first and second classes"), Dolan does not describe anything about determining "intensity values respectively representing intensity distributions of the first and second classes," as recited in claim 1. In fact, Dolan does not even hint that intensity values respectively representative of the "class" of edge pixels and the "class" of valley pixels are determined. To the contrary, Dolan expressly discloses that, after the edge pixels have been identified, each edge pixel is analyzed on the basis of its own intensity value without regard to the intensity values of any of the other edge pixels (see, e.g., col. 9, lines 7-20).

The Examiner's second premise is nonsensical. There is no possible way that a geometric distance possibly can constitute "a measure of distance separating intensity values," as recited in claim 1. Clearly, the geometric distance is a measure of the spatial distance between pixels in an image, whereas the measure of distance separating intensity values is a measure of the intensity distance between intensity values.

The Examiner's third premise is not supported by Dolan's disclosure. In particular, the ridge and valley detection process described in col. 3, lines 36-45, merely involves determining "whether the curvature of the intensity reaches a maximum absolute value at the same point that the curvature 40 of the intensity map in another direction, such as a roughly perpendicular direction, is close to zero." As explained in Dolan, this process involves computing the principal curvatures of the image surface (see col. 7, lines 48-67). This process does not involve computing "measures of peakedness of intensity histograms computed for both the first and second pixel classes," as recited in claim 1. Indeed, Dolan does not disclose or suggest anything about computing intensity histograms for the "class" of edge pixels and the "class" of valley pixels as proposed by the Examiner, nor does Dolan even hint that his method involves computing a measure of peakedness of such intensity histograms. In fact, one skilled in the art would not have had any apparent reason to believe that such computations would not serve any useful purpose whatsoever in the context of Dolan's disclosure. To the contrary, Dolan does not identify text based on the peakedness of intensity histograms of first and second pixel classes.

Instead, Dolan's method identifies text based on "the presence of one or more axes in close proximity to an edge or to each other [and] ... a geometric relationship between axes and edges, between adjacent axes, between adjacent edges or between axes, edges and other character structures" (col. 9, lines 35-40).

For at least the reasons explained above, the rejection of independent claim 1 under 35 U.S.C. § 103(a) over Dolan should be withdrawn.

In the rejection of claim 1, after laying out his position that Dolan discloses each and every element of claim 1, the Examiner (somewhat confusingly) appears to retract his position as follows (emphasis added):

Although, Dolan reference does not expressly call for measure of distance separating intensity values respectively representing intensity distributions of the first and second classes and based on measuring peakedness of intensity histograms computed for both the first and second pixel classes, it would have been obvious to a person of an ordinary skill in the art that Dolan does in fact shows "measuring in the direction of the intensity gradient when measuring to a ridge and direction opposite to the intensity gradient when measuring to a valley". Thus, an ordinary artisan would have recognized the term "measuring in the direction of the intensity gradient of an edge and an adjacent valley" as similar limitation as claim 1.

The paragraph of Dolan's disclosure from which the Examiner has quoted reads as follows (col. 4, lines 7-14):

In preferred embodiments, the distance between a pixel identified as an edge and an adjacent valley or ridge is measured in the direction of the intensity gradient when measuring to a ridge and in a direction opposite to the intensity gradient when measuring to a valley. In this manner, the distance between an edge and an adjacent valley or ridge is measured in a direction roughly perpendicular to the character stroke axis when a character is present.

In this paragraph, however, Dolan merely describes the directions in which the distances between an edge pixel and an adjacent valley or edge are measured. This paragraph does not disclose or suggest anything about computing intensity histograms for the "class" of edge pixels

and the "class" of valley pixels as proposed by the Examiner, nor does this paragraph even hint that the distance calculation process involves computing a measure of peakedness of such intensity histograms.

For at least the reasons explained above, the rejection of independent claim 1 under 35 U.S.C. § 103(a) over Dolan should be withdrawn.

3. Claims 2-8, 10, 14-16, and 18-20

Each of claims 2-8, 10, 14-16, and 18-20 incorporates the elements of independent claim 1 and therefore is patentable over Dolan for at least the same reasons explained above.

4. Independent claim 21

Independent claim 21 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore, independent claim 21 is patentable over Dolan for at least the same reasons explained above in connection with independent claim 1.

5. Claims 22-26

Each of claims 22-26 incorporates the elements of independent claim 21 and therefore is patentable over Dolan for at least the same reasons explained above.

B. Claim rejections over Dolan in view of Fritz and Lee

The Examiner has rejected claims 9 and 13 under 35 U.S.C. § 103(a) over Dolan in view of Fritz (US 6,817,982) and Lee (US 5,828,776).

Each of claims 9 and 13 incorporates the elements of independent claim 1.

Neither Fritz nor Lee makes-up for the failure of Dolan to disclose or suggest the elements of independent claim 1 discussed above.

Therefore, claims 9 and 13 are patentable over Dolan in view of Fritz and Lee for at least the same reasons explained above in connection with independent claim 1.

III. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

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